Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Previously presented): Beam current measuring apparatus comprising: a magnetism shielding part for shielding an external magnetic field; and a magnetic field sensor arranged in the shielding space generated by said magnetism shielding part, said beam current measuring apparatus measuring, by using said magnetic field sensor, a magnetic field where a beam current to be measured is generated, wherein said magnetic field sensor has a magnetic flux/feedback current conversion coefficient of 8x10-15 Wb/A or above the magnetic flux/feedback current conversion coefficient representing a ratio of a feedback current flowing to a feedback coil with respect to a change amount of magnetic flux passing through the magnetic field sensor.

Claim 2 (Original): The beam current measuring apparatus according to claim 1, wherein said magnetic field sensor has a magnetic flux/feedback current conversion coefficient of 2x10-12 Wb/A or below.

Claim 3 (Previously presented): The beam current measuring apparatus according to claim 1, wherein said magnetic field sensor has a magnetic flux/feedback current conversion coefficient of 1x10-12 Wb/A or below.

Claim 4 (Currently amended) Beam current measuring apparatus comprising: a magnetism shielding part for shielding an external magnetic field wherein the magnetism shielding part comprises a gap that receives the magnetic field; and a magnetic field sensor arranged in the shielding space generated by said magnetism shielding part, said beam current measuring apparatus measuring, by using said magnetic field sensor, a magnetic field where a beam current to be measured is generated, wherein said magnetic field sensor has a magnetic flux sensitivity of 2x10-18 Wb/V or above.

Claim 5 (Previously presented): The beam current measuring apparatus according to claim 4, wherein said magnetic field sensor has magnetic flux sensitivity of 5x10-15 Wb/V or below.

Claim 6 (Previously presented): The beam current measuring apparatus according to claim 4, wherein said magnetic field sensor has a magnetic flux sensitivity of 2x10-15 Wb/V or below.

Claim 7 (Previously presented): The beam current measuring apparatus according to claim 1, wherein said magnetic field sensor is a SQUID.

Claim 8 (Previously presented): The beam current measuring apparatus according to claim 1, wherein said magnetic field sensor is a high-temperature superconducting SQUID.

Claim 9 (Previously presented): The beam current measuring apparatus according to claim 1, wherein said magnetic field sensor comprises a magnetism shielding part for magnetically shielding from an external magnetic field a sensor part that senses magnetic flux to be measured.

Claim 10 (Currently amended) The beam current measuring apparatus according to claim 9, wherein said magnetism shielding ~~section~~ part comprises a superconductor.

Claim 11 (Currently amended): The beam current measuring apparatus according to claim 9, wherein said magnetism shielding ~~section~~ part comprises a high-temperature superconductor.

Claim 12 (Previously presented): The beam current measuring apparatus according to claim 10, wherein said magnetism

shielding ~~section~~ part comprises a gap.

Claim 13 (Previously presented): The beam current measuring apparatus according to claim 1, wherein said magnetic field sensor comprises an electric field shielding part for shielding from an external electric field a sensor part that senses magnetic flux to be measured.

Claim 14 (Previously presented): The beam current measuring apparatus according to claim 1, wherein said magnetism sensor comprises a mechanism for collecting a magnetic field generated by a beam current to be measured.

Claim 15 (Original): The beam current measuring apparatus according to claim 14, wherein said mechanism for collecting a magnetic field is a coil including a superconducting wire wound around a core of a soft magnetic material or a cylinder whose surface is coated with a high-temperature superconductor and whose outer periphery has a bridge part partially including a high-temperature superconductor.

Claim 16 (Previously presented): A beam current measuring method using the beam current measuring apparatus according to claim 1, comprising the step of: arranging a magnetic field sensor of

said beam current measuring apparatus on a beam line irradiated from an ion source or an electron ray source onto the surface of a processed substance in order to measure the beam current value of said beam line from the output of said magnetic field sensor.

Claim 17 (Original): A beam irradiation method comprising a measuring step of measuring, by using the beam current measuring method according to claim 16, a beam current of a beam generated using an ion source or an electron ray source, a control step of feeding back said beam current value obtained in said measuring step to the control parameter of said ion source or electron ray source, and an irradiating step of irradiating a beam current onto a processed substance, said beam current controlled using the control parameter obtained in said control step.

Claim 18 (Previously presented): Beam irradiation apparatus comprising the beam current measuring apparatus according to claim 1.

Claim 19 (Previously presented): A processed substance manufactured using ion implantation apparatus, electron beam exposure apparatus or accelerating apparatus comprising the beam current measuring apparatus according to claim 1.